

DETAILED ACTION

1. This action is in response to Amendment filed on 12/22/2009.
2. Claims 1, 7, 14, 18 and 20 have been amended, claims 6, 9-11 and 19 have been cancelled and claims 2, 5, 12, 13, 16 and 17 were previously cancelled. Currently, claims 1, 3, 4, 7, 8, 14, 15, 18 and 20 are pending.

Response to Amendment

3. Amendments to claims are effective to overcome the claim objections and 112 rejections (except claim 20) as presented in previous Office action. Therefore, the previous claim objections and 112 rejections (except claim 20) have been withdrawn.
4. Amendments to claims 1 and 14 are not effective to overcome the 101 rejections as presented in the previous Office action. Therefore, the previous 101 rejections have been maintained.

Response to Arguments

5. Applicant's arguments with respect to claims 1, 3, 4, 7, 8, 14, 15, 18 and 20 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

6. Claims 1, 14, 18 and 20 are objected to because of the following informalities:

Regarding claim 1, the end of line 18 should include a connection term (i.e., "and").

Regarding claim 14, the end of line 16 needs a punctuation which should be a semicolon (;).

Regarding claim 18, the end of line 20 should include a connection term (i.e., "and").

Regarding claim 20, the end of line 17 needs a punctuation which should be a semicolon (;).

Regarding claim 20, the recited "the groups" in line 10 should be "the plurality of groups" to clarify its reference to "a plurality of groups" as recited in line 8.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claim 20 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

.Regarding claim 20, the limitation of “clustering *selected* children of the node and the children of the buddy node” (line 6) is not supported by the specification.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 1, 3, 4, 7, 8, 14, 15, 18 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the entries of first node" in line 14. There is insufficient antecedent basis for this limitation in the claim. In addition, as recited, "the entries of the first node" can be interpreted as the total of entries of the first node, which must include the plurality of new entries as inserted within the first node as recited in the previous "inserting" step and the plurality of entries as recited in the "selecting" step. However, to produce a cluster of nodes having a first child node of the first node and a second child node of the first node as recited in "aggregating" step, there is a subset of entries of the first node needed to be aggregated.

Claim 14 recites the limitation "the first node" in line 21 and limitation "the plurality of new entries" in line 22. There is insufficient antecedent basis for these limitations in the claim.

Claim 18 recites the limitation "the entries of first node" in line 16. There is insufficient antecedent basis for this limitation in the claim. In addition, as recited, "the entries of the first node" can be interpreted as the total of entries of the first node, which must include the plurality of new entries as inserted within the first node as recited in the previous "inserting" step and the plurality of entries as recited in the "selecting" step. However, to produce a cluster of nodes having a first child node of the first node and a second child node of the first node as recited in "aggregating" step, there is a subset of entries of the first node needed to be aggregated.

Claim 20 recites the limitation "the first node" in line 22 and limitation "the plurality of new entries" in line 23. There is insufficient antecedent basis for these limitations in the claim.

Other dependent claims 3, 4, 7, 8 and 15 are rejected as incorporating the deficiencies of rejected claims 1 and 14 upon which they depend correspondingly.

Claim Rejections - 35 USC § 101

11. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

12. Claims 1, 3, 4, 6-11 and 14-15 rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding claims 1, 3, 4, 7, 8, 14 and 15, each of these claims is for a method/process. To satisfy the 101 requirements, a process must (1) be tied to another statutory class (such as a particular apparatus) or (2) transform underlying subject matter (such as an article or materials) to a different state or thing. Since neither of the requirements is met by the recited claims, claims 1, 3, 4, 7, 8, 14 and 15 are rejected as being directed to non-statutory subject matter. Note that "database" can be broadly interpreted as anything that stores data (e.g., paper), and the method as recited can be performed on a paper.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

15. Claims 1, 3, 4, 7, 8 and 18 (effective filing date 5/15/2003) are rejected under 35 U.S.C. 103(a) as being unpatentable over Cha et al. (US Publication No 2002/0169784, effective filing date 03/05/2001) in view of Chen et al. ("Merging R-Trees: Effective Strategies for Local Bulk Insertion", 1999).

As to claims 1 and 18, Cha et al. teaches:

“A computer-implemented method of inserting a plurality of new entries into an existing index keyed by multidimensional data” (see Cha et al., [0038]), comprising:

“selecting a first node of the index having a plurality of entries stored in a database” (see Cha et al., [0094] for locating/choosing the child node);

“aggregating the entries of the first node of the index to produce a cluster of nodes having a first child node of the first node and a second child node of the first node” (see Cha et al., [0049] for clustering index entries into nodes);

“determining that a second node including the plurality of entries would overlap the first child node of the first node and the second child node of the first node” (see Cha et al., [0056] for determining if each MBR in a node overlaps a given query rectangle wherein each MBR in a node represents one of its child nodes and a query rectangle can be interpreted as equivalent to MBR of the second node as recited);

“determining that the first child node of the first node is a leaf node” (see Cha et al., [0041] and [0090]-[0091]); and

“reorganizing the entries of the first node to reduce overlap between the plurality of entries of the first node and the plurality of new entries to replace the first child node of the first node and a second child node of the first node with new child nodes having the plurality of entries of the first node and the plurality of new entries” (see Cha et al., [0038] and [0100]-[0101] for redistributing entries and dynamically reorganizing the tree during insertion including creating new node in splitting nodes and adjusting MBRs of nodes).

However, Cha et al. does not explicitly teach:

“inserting the plurality of new entries within the first node of the index”.

On the other hand, Chen et al. teaches:

“inserting the plurality of new entries within the first node of the index” (see Chen et al., [page 12, step 4] for inserting the small tree (i.e., a plurality of entries) into the identified location (i.e., selected node)).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to incorporate the teaching of Chen et al. into Cha et al.’s system. A skilled artisan would have been motivated to do so as suggested by Chen et al. (see Abstract) that bulk inserting a plurality of entries is more effective than one by one insertion. Both of the references (Cha et al. and Chen et al.) teaches features that are directed to analogous art and they are directed to the same field of endeavor, such as, index structure for spatial data, R-tree, insertion of data into the index structure, and node merging and splitting. This close relation between both of the references highly suggests an expectation of success.

As to claim 3, this claim is rejected based on arguments given above for rejected claim 1 and is similarly rejected including the following:

Cha et al. and Chen et al. teach:

“the entries include spatial data” (see Chen et al., [page 7, paragraph 2]); and

“the index keyed by multidimensional data includes a spatial index” (see Chen et al., [page 7, paragraph 2] and [page 11, Figure 1] for R-tree as an index).

As to claim 4, this claim is rejected based on arguments given above for rejected claim 1 and is similarly rejected including the following:

Cha et al. and Chen et al. teach:

“wherein sibling nodes are for an R-Tree index” (see Chen et al., [page 11, Figure 1] and [page 14, paragraph 2]).

As to claim 7, this claim is rejected based on arguments given above for rejected claim 3 and is similarly rejected, including the following:

Cha et al. and Chen et al. teach:

“wherein said organizing includes reorganizing to reduce overlap of bounding boxes for objects in the spatial index” (see Cha et al., [0038] for redistributing entries and dynamically reorganizing the tree to improve search performance, wherein improving the search performance implies reducing overlap of bounding boxes as recited; also see Chen et al., [page 7, paragraph 2] for handling overlapping regions).

As to claim 8, this claim is rejected based on arguments given above for rejected claim 7 and is similarly rejected including the following:

Cha et al. and Chen et al. teach:

“wherein one of the bounding boxes includes a minimum bounding rectangle (MBR)” (see Cha et al., [0038]; also see Chen et al., [page 10, paragraph 2] and [page 11, paragraph 2]).

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16. Claims 14-15 and 20 (effective filing date 5/15/2003) are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (“Merging R-Trees: Effective Strategies for Local Bulk Insertion”, 1999) in view of Cha et al. (US Publication No 2002/0169784, effective filing date 03/05/2001).

As to claim 14 and 20, Chen et al. teaches:

“A computer-implemented method of inserting a plurality of entries into an existing multidimensional-keyed index organized as an R-Tree, comprising:

“associating a node in the R-tree with a buddy node that is a sibling of the node” (see Chen et al., [page 14, second paragraph] for merging siblings);

“clustering children of the node and the children of the buddy node, each of the children having entries” (see Chen et al., [page 14, second paragraph] wherein merging node includes clustering their children),

“partitioning the clustered entries of the node and the buddy node into a plurality of groups, wherein each entry of the node and buddy node corresponds to a child node, and wherein at least one of plurality of the groups includes a child node of node and the buddy node, a buddy child node associated the child node, and one or more of the plurality of entries, said partition is performed to reduce overlap among bounding boxes associated with the plurality of groups” (see Chen et al., [page 12, section 2.2.2, second paragraph] for bulk-loading which includes partitioning old data (entries of nodes of the index) and new data (a plurality of entries) into groups); and

“reorganizing the child node and the buddy child node associated the child node, wherein the reorganizing includes reorganizing the distribution of the entries in each of the child node and the buddy child node associated the child node to replace the child node and the buddy node with new nodes having the plurality of entries of the first node and the plurality of new entries” (see Chen et al., [page 14, second paragraph] wherein merging two siblings, deleting one of the sibling nodes and reinsert its data is interpreted as reorganizing the child node and the buddy child node as recited and splitting nodes can create new nodes; also see [page 11] wherein inserting the small tree adds more nodes to the original tree).

However, Chen et al. does not teach:

“inserting said one or more of the plurality of entries among the child node and the buddy child node associated the child node”;

“determining that the plurality entries would overlap the entries of the child node and buddy child node”; and

“determining that the child node is a leaf node”.

On the other hand, Cha et al. teach:

“inserting said one or more of the plurality of entries among the child node and the buddy child node associated the child node” (see Cha et al., [0097] for inserting entries among the leaf nodes);

“determining that a second node including the plurality of entries would overlap the first child node of the first node and the second child node of the first node” (see Cha et al., [0056] for determining if each MBR in a node overlaps a given query rectangle wherein each MBR in a

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node represents one of its child nodes and a query rectangle can be interpreted as equivalent to MBR of the second node as recited);

“determining that the first child node of the first node is a leaf node” (see Cha et al., [0041] and [0090]-[0091]);

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to incorporate the teaching of Cha et al. into Chen et al.'s system. A skilled artisan would have been motivated to do so as suggested by Cha et al. (see [0038]) that its teaching is applicable to R-Tree index and its variant forms to improve the search performance. Both of the references (Chen et al. and Cha et al.) teaches features that are directed to analogous art and they are directed to the same field of endeavor, such as, index structure for spatial data, R-tree, insertion of data into the index structure, and node merging and splitting. This close relation between both of the references highly suggests an expectation of success.

As to claim 15, this claim is rejected based on arguments given above for rejected claim 14 and is similarly rejected including the following:

Chen et al. and Cha et al. teach:

“each node of the R-tree is associated with a respective bounding box” (see Chen et al., [page 11, paragraph 2] for MBR of each node); and

“a first bounding box associated with the child node overlap a second bounding box associated with the buddy child node” (see Chen et al., [page 10, paragraph 2] for overlapping between the sibling MBRs).

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuong-Thao Cao whose telephone number is (571)272-2735. The examiner can normally be reached on 8:30 AM - 5:00 PM (Mon - Fri).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Rones can be reached on (571) 272-4085. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Art Unit 2164
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